Gold Dust Mine, Mill, and Camp Complex
Wards Gulch
Salmon Vicinity
Lemhi County
Idaho

HAER No. ID-24

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ID,
30-SAL.V,
3-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Western Regional Office
National Park Service
U.S. Department of the Interior
San Francisco, California 94107

HISTORIC AMERICAN ENGINEERING RECORD

HAER ID. 30-SALM. 3-

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I. INTRODUCTION

Location: The Gold Dust Mine, Mill, and Camp lie in Wards Gulch in the historic Leesburg or Mackinaw Mining District. The complex is about 11 miles northwest of Salmon, the seat of Lemhi County, Idaho

UTM: Zone 11,727290 E, 5013610 N
Quad: Leesburg, 1989 (provisional), 7.5'

Date of Construction: ca. 1903

Present Owner: Meridian Gold Company
Salmon, Idaho

Present Use: Abandoned

Significance: The Gold Dust Mine, Mill, and Camp are locally significant as a representative example of the small lode mines which operated in the Leesburg Basin during the late nineteenth and early twentieth centuries. Because Leesburg was primarily a placer mining area, these mines were few in number and accounted for only a small percent of the area's gold production. Among the most long-lived of the Leesburg lode claims was the Gold Dust; it operated sporadicaLly between 1895 and 1939.

Historian: Mitzi Rossillon
Renewable Technologies, Inc.
Butte, Montana

December 1992

II. HISTORY

A. THE LEESBURG MINING DISTRICT

The Leesburg Basin is a high mountain area in Lemhi County, east-central Idaho, which encompasses the drainage basin of Napias Creek and its tributaries.[1] The Leesburg Mining District, later known as the Mackinaw District, includes the entire basin plus the Moose Creek drainage, which begins immediately northeast of Napias Creek.

Mining activity in the Leesburg area began in 1866 when B.F. Sharkey, Elijah Mulkey, William Smith, Ward Girton, and Joseph Rapp left Deer Lodge, Montana Territory, on a gold prospecting trip to Idaho. The men arrived in the Leesburg Basin during the summer, and on August 12 discovered placer gold along a creek which became known as Wards Gulch. When word of the discovery leaked later that fall, the gold rush to the Leesburg Basin began. A mining district was immediately established and the community of Leesburg founded. Reportedly, 400-500 miners wintered there, amidst a small collection of businesses and houses. The basin's isolated location in the Salmon River Mountains and a long and snowy 1866-1867 winter kept the number of prospectors relatively low until the following spring when between 3000 and 7000 people moved to the newly-formed mining district. The new arrivals were greeted by a booming mining camp where about 130 buildings were standing or in the process of being built.[2]

Though tempered by the sobering reality of the mountain climate, boulders in some of the placer ground, and only modest gold recovery, the Leesburg boom continued through 1867 and 1868. Production in 1868 reached about $750,000 or three times that of the previous year.[3]

Both individuals and small companies conducted mining during Leesburg's first years. The latter included the Discovery Company which was formed by the five men who initially found gold in the basin and reportedly operated for 10 years. Most of the early claims were worked by hand, although a few hydraulic (giant) mines operated during the latter part of the nineteenth century.[4]

The excitement of the Loon Creek, Yellowjacket, and other discoveries in central Idaho in the late 1860s spelled the end of the Leesburg boom, but not the end of placer mining. By 1870, Leesburg's population dropped to 175.[5] After departure of most of the Euro-Americans, Chinese placer miners took over many of the Leesburg claims. A handful of Chinese remained in the area well into the twentieth century.[6] Although there is a paucity of records from this period (1870-1900), production appears to have been limited.

While other camps in central Idaho revived after the placer mining bust with the discovery and development of lode claims, such was not the case at Leesburg. Between 1901 and 1954, lode mines accounted for less than 15 percent of all mineral production in the basin. The Italian Mine, which commenced operations in 1892 and operated sporadically until the early 1920s, proved the most productive of the Leesburg Basin lode mines, yielding abut $175,000 by 1904.[7]

Although relatively few miners remained,[8] placer mining at Leesburg continued into the twentieth century, and hydraulic, drag-line, and dredge mining operations owned by corporations dominated. The most productive and impressive of the mechanical placer operations was the dredge which the Pacific Dredge Company (and later John Mullan) operated on Moose Creek between the late 1890s and 1919.[9] An estimated $1 million worth of gold was recovered by the dredge.[10] Smaller hydraulic and drag-line operations employed a few people between 1908 and the 1950s. Records of the Idaho Inspector of Mines, the U.S. Geological Survey, and the U.S. Bureau of Mines indicate limited production by these latter companies.[11]

Ironically, the establishment and growth of the town of Salmon is Leesburg's most important contribution to the history of Idaho. Founded as a shipping point for supplies to the town of Leesburg and its mines, the town grew rapidly. It had gained such prominence by 1869 that it was selected as the seat of the newly-formed Lemhi County. The gold rush to Leesburg also introduced this undeveloped area of central Idaho to ranchers, merchants, and other developers who were to become the mainstay of the local economy.[12]

B. GOLD DUST MINE

The Gold Dust Mine is one of a small number of hardrock mines in the Leesburg Basin which was developed at the turn of the century when mining at lode claims was most active. It is located in Wards Gulch about 1¼ miles north-northeast of the town of Leesburg. The mine is comprised of four claims, the Gold Dust and Independence lode claims and the Hasbrouch and Burt placer claims. Despite construction of a modern mill in 1903 and other improvements to the property made between 1895 and 1939, the Gold Dust was never successful.

Edward N. Magner located the Gold Dust in 1895, and Charles E. Rives the Independence in the same year. The two men and J.H. Rives, located a third claim, the Free Gold, at approximately the same time. These three claims became the assets of the Gold Dust Mining Company, a Utah corporation established in October of 1895. Edward N. Magner, J.H. Rives, C.E. Rives, L.S. Davis, Frank B. Stephens, and Benjamin

M. Harmon, the first three men being residents of Leesburg and the others of Salt Lake City, were the incorporators.[13]

The mining company had plans for a 10-stamp mill which it expected to have in place soon when Orion E. Kirkpatrick, the future and long-term owner and manager of the Gold Dust claims, arrived at Leesburg in 1896.[14] For unknown reasons, however, the company did not erect the mill until 1903.[15] The mill stood on the Hasbrouch Placer claim which was located in 1902. (The adjacent Burt Placer was located in the previous year).[16]

While construction of the stamp mill was an important step in the development of the property, it did not get the mining operation off the ground. Two years later, the Idaho Inspector of Mines cautiously wrote of the Gold Dust:

> This property is equipped with a modern 10-stamp mill that has made several test runs and demonstrated the fact that additional machinery will be required for the successful treatment of its ores, and the company have [sic] recently added 3,000 pounds of machinery and material for a cyanide annex ... .[17]

There is no indication that the addition of a cyanide plant aided production. The Annual Reports of the Mining Industry of Idaho and the U.S. Geological Survey's and Bureau of Mines' Mineral Resources of the United States and Minerals Yearbook reported no return for the entire life of the mine.

A detailed list of equipment published several years later in the American Mining and Metallurgical Manual reveals that the Gold Dust operation included a steam power plant, jaw crusher, 10 stamps, a classifier, agitators, and a filter at its 50 ton plate amalgamation mill and cyanide plant (see Section IV.B.).[18]

In 1910, R.A. Hasbrouch obtained the assets of the Gold Dust Mining Company, including four claims and all associated mine and mill buildings and equipment, as the result of a judgment against the company in a suit brought by the Salt Lake Security and Trust Company. One year later, Hasbrouch, along with William S. Burton, Willard C. Burton, L.G. Burton, and A.K. Tiernan, incorporated the Leesburg Gold Dust Mining Company which had its principal office in Salt Lake City.[19]

The Leesburg Gold Dust Mining Company fared no better than had its predecessor, although 1921 and 1925-1927 saw limited work by a handful of men.[20] The company patented the Hasbrouch and Burt placers in 1920.[21] According to the Idaho Inspector of Mines, the company's charter was forfeited in 1926.[22]

O.E. Kirkpatrick apparently continued to work the Gold Dust without the benefit of corporate ownership[23] until 1930, when the Leesburg Lode and Placer Mining Company was incorporated, with Kirkpatrick, E.K. Abbott, J.A. Herndon, W.C. Smith, and F.H. Havemann as its directors. The company held several patented and unpatented claims at Leesburg, including the Gold Dust group.[24] Work during the following nine years, supervised by Kirkpatrick, was confined to annual labor and mine repair and maintenance.[25] With Kirkpatrick's death in 1939, the company apparently dissolved and the Gold Dust group was never again actively mined.

In his 1913 report of mineral deposits in Lemhi County, published shortly after the addition of the cyanide plant at the Gold Dust, a U.S. Geological Survey engineer concisely identified the reason for the mine's lack of success. He wrote, "the ore bodies are considerably broken and mineralization is not intense."[26] Some Leesburg residents reached the same conclusion--there just wasn't enough gold.[27]

III. ORION E. KIRKPATRICK

Orion E. Kirkpatrick was a long-time resident of Leesburg who actively promoted mining through his own companies and his enthusiastic boostering of any and all mining ventures in the basin. But, from the viewpoint of the modern observer, his enthusiasm was misplaced and his devotion to Leesburg almost sad. Kirkpatrick devoted most of his adult life to a mining district whose riches, after the most easily accessible placer deposits were depleted, were all but irretrievable.

Born in Ohio in 1863, Kirkpatrick farmed in that state until 1884 when he moved to Kentucky. During the ensuing 12 years, he traveled to the Mid-West and later the Intermountain West where was involved in numerous mining enterprises. He moved to Leesburg in 1896 and remained there for the final 43 years of his life.[28]

Upon his arrival at Leesburg, Kirkpatrick assumed management of the operation of the Gold Dust Mine, a property located the previous year. He also developed the Gold Flint and the Gold Ridge mines at the turn of the century.[29] Between 1900 and 1939, he located over 50 claims in the area.[30] Kirkpatrick often used ground sluices and hydraulic equipment to mine his placer claims, presumably when no capital was available to work the lode mines.[31]

During his life, he was recognized as the area's foremost historian, having written A History of the Leesburg Pioneers, in large part about the men who first sought gold in the Napias Creek drainage.[32] In his brief autobiography, Kirkpatrick described his other contributions and interests, including his two-year term as a state representative in 1905-

1906, his membership in three fraternal organizations, and his position as mining recorder for the Leesburg District.[33]

IV. THE GOLD DUST MINE, MILL, AND CAMP

A. PHYSICAL DESCRIPTION

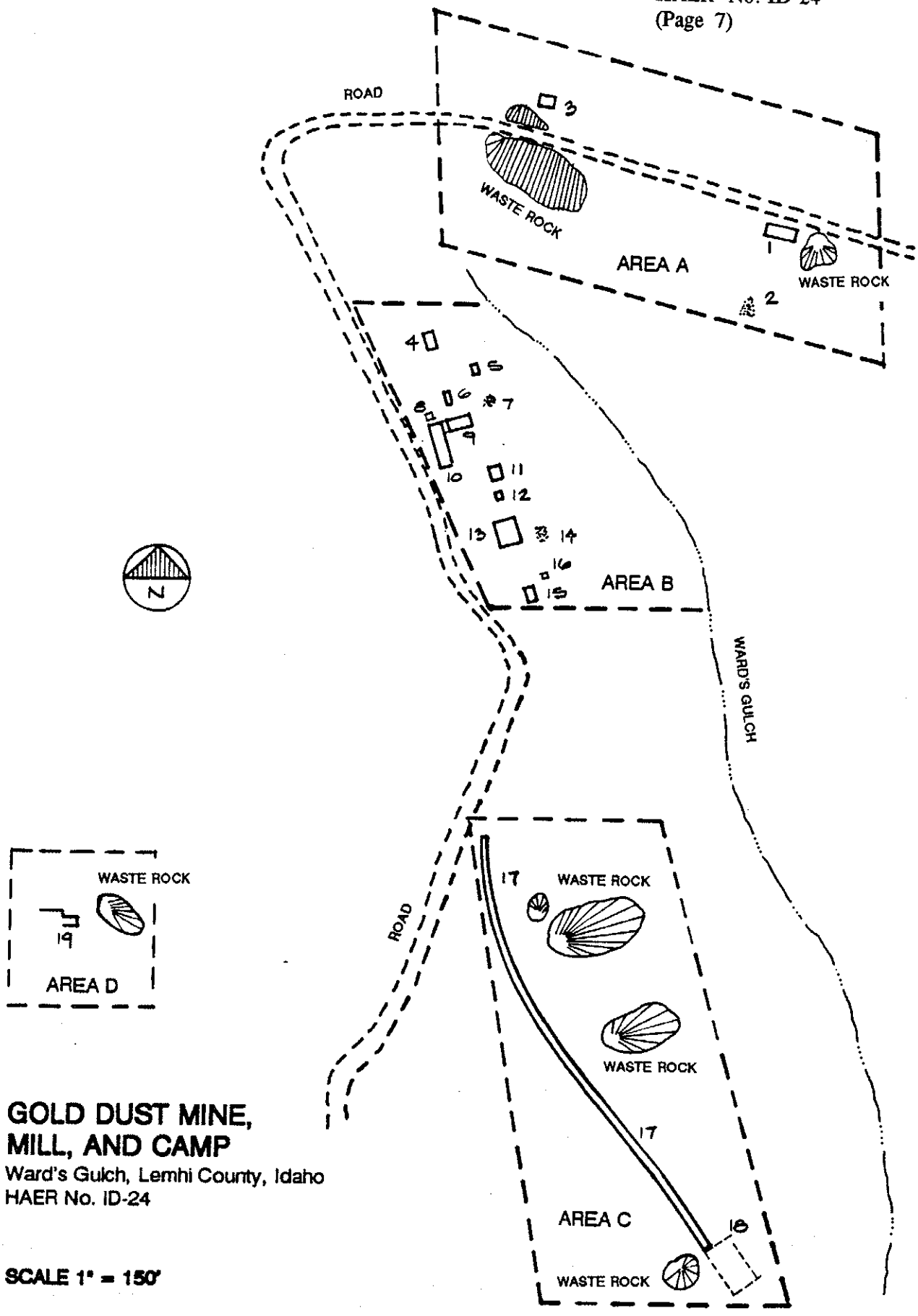
A total of 19 features, concentrated in four areas, have been identified at the Gold Dust Mine, Mill, and Camp. Area A consists of a log cabin, an associated dump, and a collapsed wood-frame building (Features 1-3). Area B is the main residential portion of the site, at which there are two dumps and the remains of 10 buildings (Features 4-16; HAER photographs ID-24-1, 3, and 5). Area C is the mill site, and consists of the remains of the mill and a tram (Features 17 and 18; HAER photographs ID-24-3, 4, and 7). Area D contains the hoist house (Feature 19) situated on the hill above the mill.

Area A

Area A lies on the east side of Wards Gulch, partially within the boundaries of the Gold Dust Lode claim, but mostly on unpatented property.

Feature 1 is a log cabin which measures 23 feet 3 inches by 11 feet 8 inches (HAER photograph ID-24-A-1). While it is partially collapsed, several details of its construction were recorded prior to collapse[34] and others can be determined with some intact physical remains. The building, constructed in two phases, lies on a platform dug into the sloping ground; the ground level behind the cabin (on the north) is much higher than it is on the front. The original section of the cabin lies to the west and measures approximately 14 feet 10 inches by 11 feet 8½ inches. The 7-inch logs which form the walls are saddle notched, chinked with split wood wedges, and caulked with mud. The side gable roof was supported by a log ridgepole and purlins and was covered with wood shingles and dirt. A stove pipe hole and flashing lies in the northeast corner of this room. Cut nails were used throughout the original section, indicating construction in the late nineteenth century, probably prior to 1890. The log addition attached to the east side of the original building has lap-notched corners. It contains its own exterior doorway, also facing south, and a second door in the east wall near the northeast corner of the cabin.

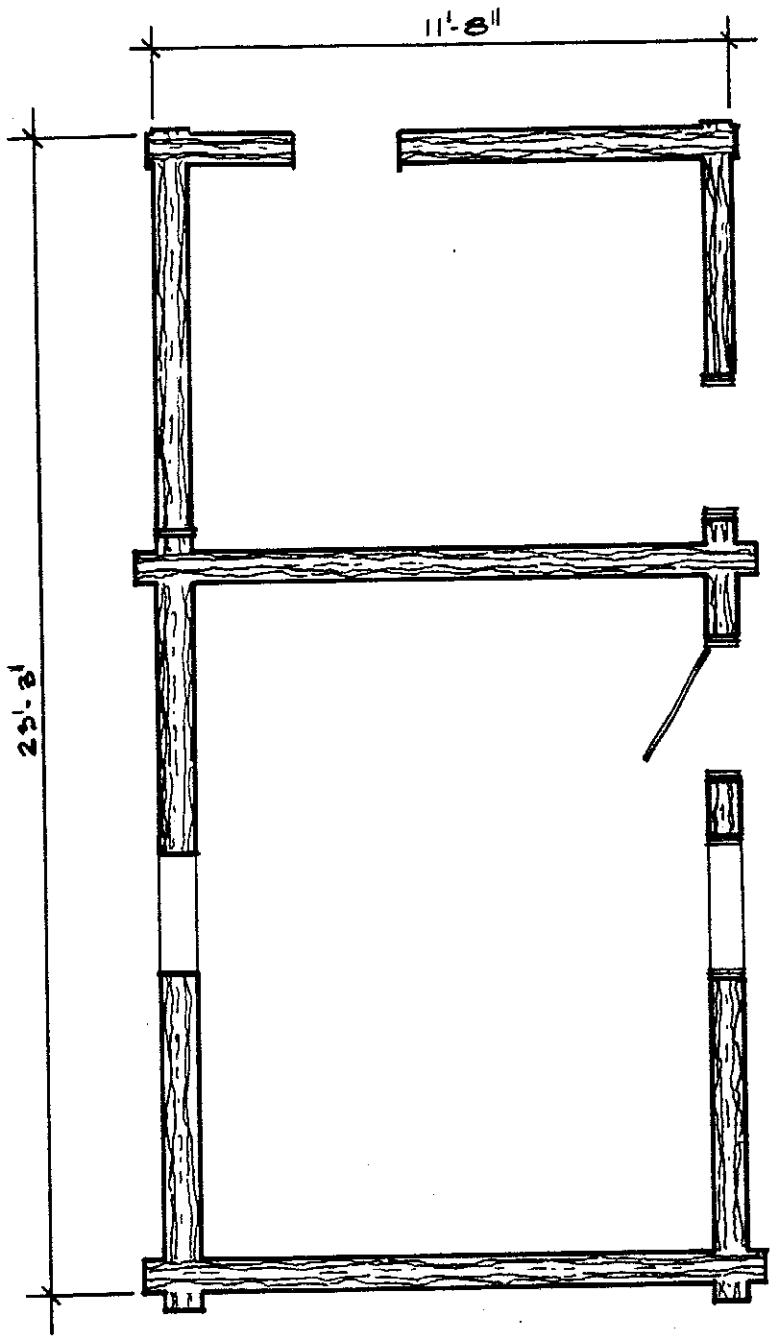
Feature 2 is a domestic dump associated with Feature 1. The material lies on a steep slope and covers an area of about 1700 square feet, but is mostly concentrated in a 150 square foot area. Selective surface collection and shovel testing at the feature revealed a range of artifacts dating between the late nineteenth century and the 1920s or



GOLD DUST MINE, MILL, AND CAMP

Ward's Gulch, Lemhi County, Idaho
HAER No. ID-24

SCALE 1" = 150'



PLAN —— SCALE 1/4" = 1'-0"
CABIN (Feature #1)

possibly later. Fifty percent of the recovered artifacts were tin cans; of those which had temporally diagnostic attributes, about three-fourths dated after about 1904. Fragments of bottle glass and dinnerware accounted for a small percent of the artifacts. Most datable pieces were manufactured between 1890 and World War I.[35]

Feature 3 is a completely collapsed, wood-frame building which once measured about 10 feet square. It lies adjacent to a collapsed adit with an associated waste rock pile, and presumably had some sort of mining function.

Also in Area A is a second waste rock pile, this one situated about 20 feet east of the log cabin. The location of the associated adit or mine shaft was not identified.

Area B

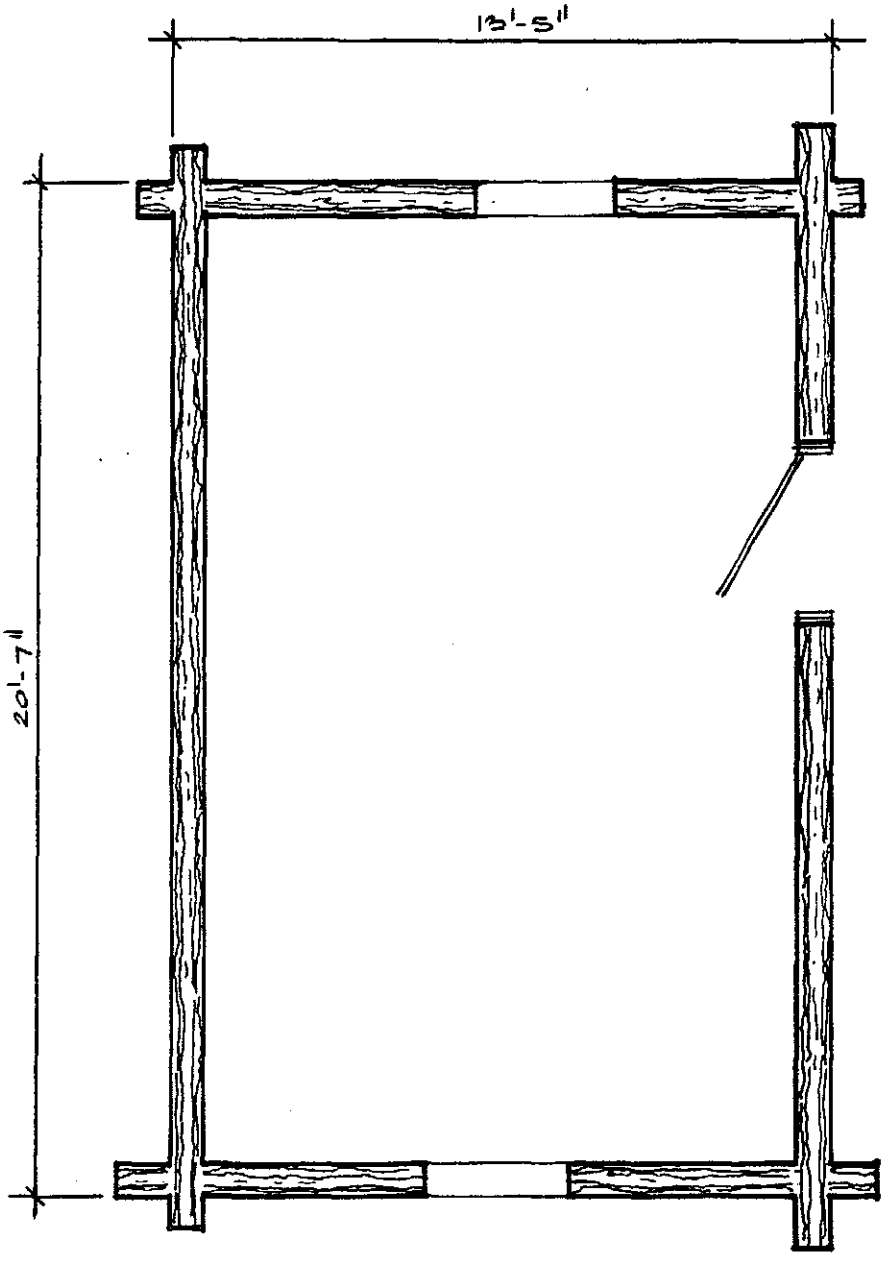
Area B, the residential portion of the Gold Dust property, lies completely within the boundaries of the Gold Dust Lode claim and on the west side of Wards Gulch. It was once the site of several log and wood-frame buildings, not all of which remain standing today. Most of the buildings were probably built between 1900 and 1910, the peak of activity at the Gold Dust. The Salmon newspaper reported the construction of several buildings at the Gold Dust camp in 1903.[36]

Feature 4 lies at the north end of the camp complex. It is a partially collapsed, log building which measures 20 feet 7 inches by 13 feet 5 inches (HAER photograph ID-24-B-1). The wall logs are saddle-notched at the corners and chinked with split wood wedges. The side gable roof consists of three layers--planks over dirt over half poles--resting on log purlins. Wire nails are used throughout the building. The door, which faces east or down toward Wards Gulch, remains intact and is made of 1 x 12 vertical boards with 1 x 6 exterior bracing. It opens to the inside on V-strap hinges. The windows, one each on either short side, have been removed.

Feature 5 is a completely collapsed, wood-frame building which measured approximately 13 feet square. The building's siding, fenestration, and roof type cannot be determined from the remains. A small can dump lies immediately to the east.

Feature 6 is a completely collapsed, wood-frame building which originally measured about 12 feet by 24 feet.

Feature 7 is a sparse scatter of domestic artifacts, the edge of which lies less than 20 feet north of Feature 9. The artifacts, which cover about 1500 square feet, may have been dumped by the occupants of Features 5, 6, 9, and/or 10. Found on the surface and in six shovel tests, they include cow bone, dinnerware fragments, bottle glass, tin cans,



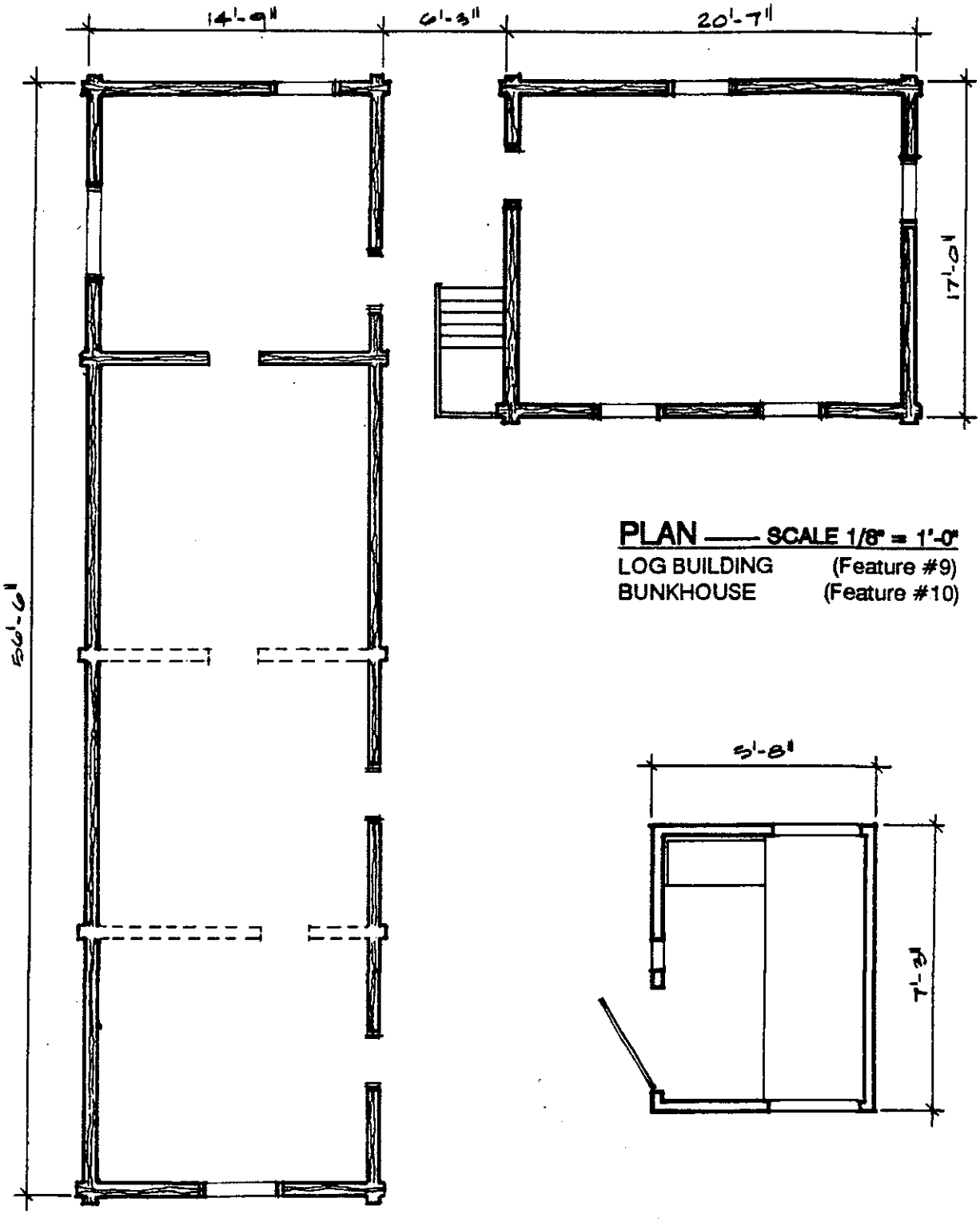
PLAN —— SCALE 1/4" = 1'-0"
CABIN (Feature #4)

window glass, pieces of a stove, and cut nails. Cuts of meat represented by the bone are rump, arm, round steak, hinds hand, sirloin, and rib. Temporally diagnostic artifacts at the dump were manufactured between about 1890 and the 1920s or later.[37]

Feature 8 is a root cellar situated just beyond the north end of Feature 10. The dugout is partially collapsed, but appears to have been about 9 feet square. The entrance on the east is marked by a break in a wall of small logs or poles laid horizontally.

Feature 9 is a log building which measures 20 feet 7 inches long by 17 feet wide (HAER photograph ID-24-1). The wall logs are lap-notched at the corners, chinked with poles, and caulked with mud and concrete. On the exterior west wall and all of the interior walls, the logs have been hewn to provide a relatively flat surface. The front gable roof has completely collapsed, and its construction materials could not be determined. A board and batten addition on the west side of the building at the southwest corner measures 3 feet 1½ inches wide by 8 feet long. It contains wooden steps that lead to a cellar. The batten, made from scraps of wooden boxes, is nailed to the inside of the addition. The single doorway on the main floor faces west toward Feature 10. In fact, the two buildings, which stand only 6 feet 3 inches apart, were once joined by a covered or enclosed breezeway. The windows in the north, east, and south walls have all been removed, but were originally 6/6 double hung, according to a historic photograph. In the east wall near the southeast corner is a small opening at about the elevation of the floor. It resembles a chick door in size and position, but that function is not compatible with the apparent residential or domestic function of the building. Shelving is attached to the south wall just below the bottom of the windows. A piece of 1 5/8 inch pipe stands vertically near the interior southeast corner of the building, piercing the shelving there. The pipe suggests the use of running water at this building; perhaps Feature 9 served as the cookshack for the Gold Dust complex.

Feature 10 is the partially collapsed, log bunkhouse which measures about 56 feet 6 inches long by 14 feet 9 inches wide (HAER photographs ID-24-1 and ID-24-C-1). The lapped and saddle notched logs are chinked with poles and caulked with concrete. The side gable roof is composed of several layers, beginning with split poles, then dirt, then 2 x 4 rafters, then boards, and finally tar paper. The building is divided into four rooms, with logs forming the interior walls. All rooms (with the possible exception of the third from the south which is collapsed) have exterior doors on the east side. Interconnecting doors are situated roughly at the center of the interior walls. There is one window each on either short end of the building and a window in the west wall at the room farthest north. (Evidence of other windows could not be found because the wall is almost completely collapsed.)



PLAN —— SCALE 1/8" = 1'-0"
LOG BUILDING (Feature #9)
BUNKHOUSE (Feature #10)

PLAN —— SCALE 1/4" = 1'-0"
SHED (Feature #12)

Feature 11 is a completely collapsed, wood-frame building which originally measured about 17 feet square.

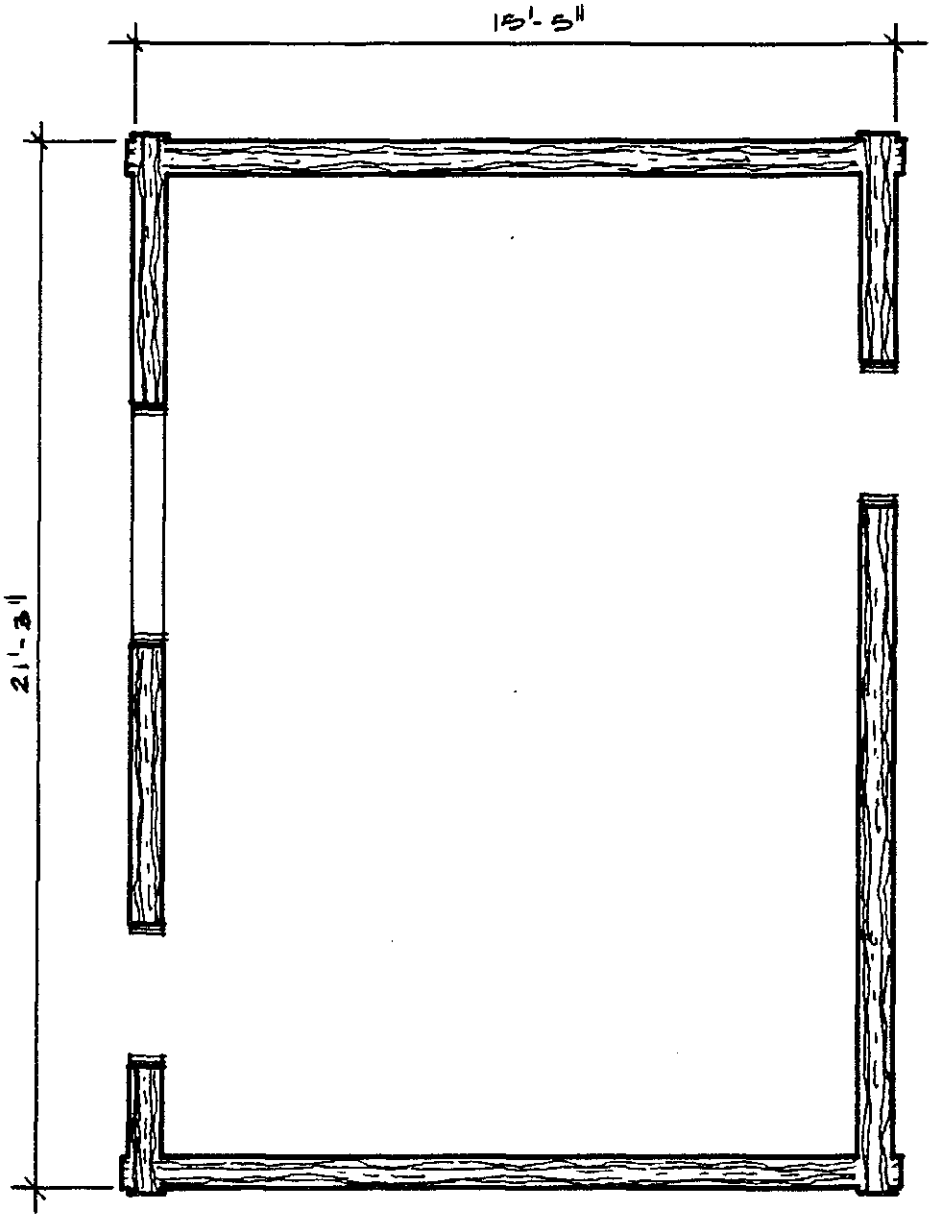
Feature 12 is a small, wood-frame building covered with board and batten siding (HAER photograph ID-24-D-1). Measuring 5 feet 8 inches by 7 feet 3 inches, it has a side gable roof made of a 2 x 4 ridge pole and purlins covered with board and batten roofing. The single exterior door faces west. It is made of 1 x 10 inch boards and opens to the outside. There is a window opening in each of the short ends, but neither of the windows remain. Inside, a 2 foot 5 inch-wide bench covers the entire back or east wall; two shelves are located on the north wall at the northwest corner. The size and furnishings of the building suggests that Feature 12 was a tool shed. Not shown in available historic photographs of the site, the shed may date to the 1930s or later.

Feature 13 is a completely collapsed, log building which originally measured about 16 feet by 24 feet. It appears to have been a single story building with a basement, however, the main floor has been completely removed. The only fenestration that is apparent from the remains is an exterior door to the basement on the west wall near the southwest corner and a window measuring 2 feet 11 inches high by 4 feet 5 inches wide which appears to have fallen from the south side of the main level.

A comparison of historic photographs of the Gold Dust Residential Camp and of O.E. Kirkpatrick's house with the physical remains at the camp indicate that Feature 13 was Kirkpatrick's residence. Although the main level of the house has been removed, the position of the building in the camp and the comparatively large window in the south wall support this conclusion.

Feature 14 is a can dump which lies immediately east of Feature 13 and covers over 2000 square feet. Datable attributes of the cans and a few bottle fragments suggest that most of the trash was dumped after about 1910.[38]

Feature 15 is a partially collapsed log building standing at the south end of the residential camp (HAER photograph ID-24-E-1). It measures about 21 feet 3 inches by 15 feet 5 inches. The unpeeled logs are lap-notched at the corners, chinked with split wood wedges, and caulked with concrete. The logs are hewn on the interior and have been insulated with a thin layer of untreated building paper. Wire nails were used throughout the building. A side gable roof of planks and tar paper covered Feature 15. Exterior doorways are located on the east and west sides in opposite corners of the building. The doors themselves have been removed, as has the single window on the west wall. The building had a wood floor made of 1 x 12 boards resting on 2 x 8 floor joists. It also had a plain, 1 x 6 baseboard.



N

PLAN —— SCALE 1/4" = 1'-0"
LOG BUILDING (Feature #15)

Feature 16 is the remains of a privy located 27 feet east of Feature 15. The structure has collapsed, but 1-inch boards lying on the ground near the privy depression suggest wood-frame construction, and a line of rock indicates an unmortared rock foundation. A 1 x 2-foot archaeological shovel test excavated in the depression yielded only eight artifacts, these apparently discarded after the structure was no longer used as a privy.

> "The items include bone, metal fragments, shoe pieces, unknown ceramics, and small amounts of glass fragments, including a complete machine mold small liquor flask. The clear glass flask had no markings for place and date of origin."

No latrine fill was encountered, although it is possible that it lies deeper than 24 inches below the surface, where excavations ceased.[39]

Area C

Area C lies at the south end of the Gold Dust complex, within the boundaries of the Hasbrouch Placer claim. It includes the mill site and the tram over which the ore was conveyed from the mine to the mill.

Feature 17 is the tram which has completely collapsed (HAER photograph ID-24-F-1). It was originally 450 feet long and presumably ran from an adit (its location no longer apparent on the ground surface) southeast on an artificial terrace. The northernmost 40 feet of the tram lay on a wooden trestle which spanned a gulley. Historic photographs of the tram show that it was covered by a gable-roofed, wood-frame structure. A gable-roofed machine/blacksmith shop which stood at the north end of the tram has been completely removed.[40]

Feature 18 is the remains of the Gold Dust Mill which was built in 1903. The building itself has been removed, but the boiler, a concrete footing, the camshaft from the stamp battery, and the base of the cyanide tank remain at the site (HAER photographs ID-24-G-1 to G-4). There is also an ore car and other metal machine parts and debris at the end of the tram where the ore entered the mill. The boiler rests on a stone foundation which measures about 7 by 12 feet. The concrete footing was presumably part of the foundation for the 10-stamp battery which stood on-site. The base of the cyanide tank lies in a deep excavation at the south edge of the mill. The wooden tank was 11 feet 10 inches in diameter and made of 2 x 6 boards set vertically. The walls were supported by 2½ inch-wide straps of 1/8 inch steel. The tank had a wooden floor made of tongue-and-groove 2 x 12s on 4 x 4 joists. The tank was apparently destroyed by fire.

Historic photographs of the mill show a multi-story, wood-frame building with a gable roof and a gable dormer where the tram attached to the mill. The building appears to have stood on a cribbed log foundation. In addition to the main mill building and located just to the northeast were another two or more structures, the largest with a shed roof, which served as the boiler room and/or sawmill.[41] A smaller shed-roofed building attached to the larger one may have been the assay office which a regional newspaper reported at the Gold Dust Mine in 1938.[42]

Area C is the site of several piles of waste rock, a prospect pit, and a collapsed mine shaft. These features may represent attempts to work underground deposits prior to construction of the Gold Dust Mill.

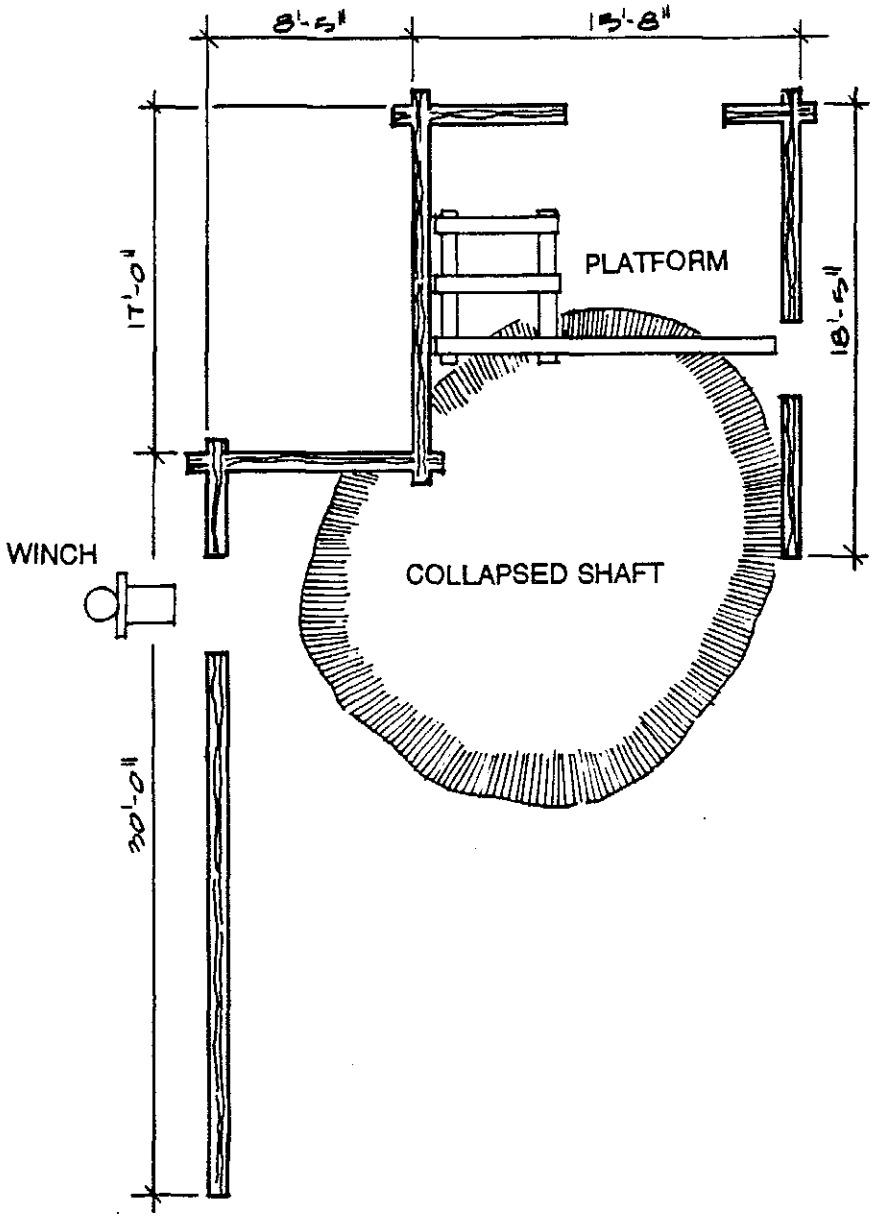
Area D

This last area of the Gold Dust complex contains the winch or hoist house on the hillside above and to the west of the mill.

Feature 19 is an L-shaped structure which stood above the Gold Dust Mine shaft. It housed the winch which raised ore to an adit, from which the ore was wheeled to the adit entrance, also the north end of the tram (the adit and tram are about 110 feet lower in elevation than the winch house). More than half of the building has collapsed and the roof is completely gone. The building was about 60 feet long by 15 feet 8 inches at the front and about 23 feet at the back. The wall logs are steeple-notched at the corners and, at present, do not exhibit any evidence of chinking or caulking. Wire nails and spikes were used throughout the structure. Built on moderately sloping ground, a platform was excavated into the hillside to accommodate the west end of the structure. There are two exterior doorways, one on the east end of the structure and another on the north. The winch, manufactured by the Contractors Plant Manufacturing Company of Buffalo, New York, now stands outside the structure just beyond the north doorway. Inside the structure is what appears to be a platform made of logs toe-nailed and pegged together. Perhaps this was the framework to which the winch/hoist was attached. A single window opening exists on the south wall.

At the southwest end of the structure is a platform, dug up to 2 feet deep into the sloping hillside, which measures about 12 x 19 feet. It appears that a second building or an addition to Feature 19 stood there at one time, but nothing of the superstructure remains.

Area D also has several prospect pits and a large waste rock pile below Feature 19. The large waste rock pile, at least, may remain from a time prior to construction of the Gold Dust Mill and tram.



PLAN —— SCALE 1/4" = 1'-0"
HOIST HOUSE (Feature #19)

B. MILL TECHNOLOGY

While little of the Gold Dust Mill remains, the operation can be reconstructed with historical documents, photographs, and the structural remnants. As mentioned above, the mill was equipped with a steam power plant, jaw crusher, a 10 stamp battery, a classifier, agitators, filter, amalgamation equipment, and a cyanide plant. When it was completed in 1903, The (Salmon) Idaho Recorder featured the mill in a front-page article, describing it as follows.

> It is set on a solid granite foundation, occupies a ground space of 40x60 feet, and has an elevation of 71 feet. Engines, battries, plates and tables occupy the first floor, ore bins the second, and ore crushers, screens, etc., the third floor.[43]

These types of equipment and their arrangement were more or less standard for small milling operations of the early twentieth century in the American West. The following description of milling at the Gold Dust is partially fact and partially conjecture, the latter based on a contemporary report about small mills of the time.[44]

Most small hardrock operations moved ore from the mine to the mill by tram. Mills were situated as close to the entrance to the mine as possible, but in such a position that the top of the mill was at about the same elevation as the entrance. At the Gold Dust, the winch or hoist at the winch house (Feature 19) lifted the ore from the mine to a point about 120 feet below the house. An adit at this level lay between the shaft (below the winch house) and the hillside to the east. Ore was moved via ore cart from the shaft, along this adit, to the surface, at which point the cars moved onto the tram. Cars may have been hand-pushed or pulled by mules or horses.

At the Gold Dust the tram skirted the east-facing hillside for a distance of about 450 feet. The tram was covered, probably in anticipation of milling during the winter months when heavy snowfall could be expected.

Near the mouth of the adit stood machine and blacksmith shops. The position of the blacksmith shop at an entrance to the mine indicates that the blacksmith worked most often for the mining portion of the operation, sharpening drill bits, repairing ore cars, and the like.

The Gold Dust tram ended at a dormer at the back of the mill. The dormer likely housed the ore bin or hopper where ore was temporarily stored before the milling process began. Ore then passed over or through a screen or grizzly (a series of metal

bars). This equipment separated the ore sent to the rock breaker from that sent to the stamps.[45]

The first step in the actual milling process was breaking the largest pieces of ore by means of a rock breaker, located on the top floor. At the Gold Dust, the breaker was a jaw crusher which crushed the ore between one stationary and one moving jaw.[46]

From there, the crushed ore dropped to the stamps which pulverized it. The number of stamps varied with the size of the mining operation, but 10 stamps--the number used at the Gold Dust--were regularly used in smaller mills. While stamps were popular, their limitations were widely recognized. They did not produce a consistent grain size and smashed the gold onto small pieces of rock which made it virtually impossible to recover by amalgamation (see below).[47]

After leaving the stamps, located on the first floor, the material passed to the classifier which insured that grains of comparable size and density were forwarded to the concentrator(s). The classifier was a sloping table over which the fine grains of ore are washed. Slimes (water-saturated, fine-grained material) leaving the classifier passed through a pipe to jiggers or agitators which agitated the material with an up-and-down motion, further classifying the material.[48]

Classified material was then moved to the amalgamation plates, also on the lower floor. Amalgamation was the process of retrieving gold by passing the fine material over a copper plate about 8 feet long which has been coated "with a mixture of fine sand, chloride of ammonium, and a small amount of quicksilver."[49] The gold is attracted to the quicksilver or mercury, forming an alloy. The "filter" mentioned above in the list of equipment at the Gold Dust may have been used to recover the gold from the amalgam, although a retort would also have been required.[50] Alternately, the operators sent the amalgam away for the final processing.

At most mines in the West, the majority of the gold in the ore was associated with sulphides and therefore could not be recovered by amalgamation alone. Additional concentration was required. This was also the case at the Gold Dust; within two years of building the amalgamation plant, the mine's owners had made plans for a cyanide plant which was constructed on the south side of the mill.

In the cyanide process of gold extraction, material which had passed over the amalgamation table was dumped into large, wooden or steel vats with 35-50 ton capacity and were "treated with a weak solution of cyanide of potassium." After about 12 hours, the solution was drained into a second vat, a precipitating vat, in which zinc shavings were placed. As the zinc dissolved, the gold precipitated from the solution. This second

step required 6-12 hours.[51] The precipitate may have been sent to a smelter for the final recovery process.

Steam powered the stamps, agitators, and perhaps other equipment at the Gold Dust Mill. As discussed previously, a boiler house where the steam was produced was constructed adjacent to the mill.[52]

V. FUTURE OF THE PROPERTY

The Gold Dust Mine, Mill, and Camp lie within the impact area of a large open-pit mining operation proposed by Meridian Gold Company and known as the Beartrack Gold Project. A portion of the property will be covered by a wasterock dump and the existing road through the property will be widened and improved for use as a haul road. Until last winter, Meridian was prepared to begin construction of the Beartrack facility in 1993, but has recently placed the project on-hold.

The property was determined eligible for listing in the National Register of Historic Places by consensus between the Salmon National Forest and the Idaho State Historic Preservation Office. As specified by a Programmatic Agreement signed on August 2, 1991, this HAER document has been prepared as mitigation for the damage to the property. Readers are referred to three other documents, "Bonanza Hydraulic Mining Site" (HAER No. ID-23), "Leesburg Mining District" (HAER No. ID-25), and "Leesburg Townsite" (HABS No. ID-106), which have been prepared for other properties in the Leesburg Basin, as stipulated in the August 2 Memorandum of Agreement.

VI. ENDNOTES

1. U.S. Department of the Interior, Geological Survey, "Geology and Ore Deposits of Lemhi County, Idaho," by Joseph B. Umpleby, U.S. Geological Survey Bulletin 528 (Washington, D.C.: Geological Survey, 1913), 148.

2. Several authors have written of the early history of the Leesburg Basin, including George E. Shoup, History of Lemhi County (Salmon: Salmon Recorder Herald, 1940, reprint Boise: Idaho State Library, 1969, page numbers refer to reprint edition); Orion E. Kirkpatrick, History of the Leesburg Pioneers (Salt Lake City: Pyramid Press, 1934), 23-25; Idaho Bureau of Mines and Geology, "Gold Camps and Silver Cities," by Merle W. Wells, Idaho Bureau of Mines and Geology Bulletin 22 (Moscow, Idaho: Idaho Bureau of Mines and Geology, 1983), 67-72; A. Dudley Gardner, "Cultural Setting," in "A Cultural Resources Inventory of the Meridian Gold Company Beartrack Project, Lemhi County, Idaho," by Michael R. Polk (Ogden, Utah: Sagebrush Archaeological Consultants, 1991), 11-41; Robert R.

Kautz, Dan Scurlock, and Amy C. Earls, "Research Design and Methods," in "Cultural Resources Investigations of Leesburg and Vicinity, Lemhi County, Idaho: Draft," (Austin, Texas, and Reno, Nevada: Mariah Associates, 1992), 10-20. Note that Kirkpatrick and Shoup provide two different dates for the original discovery, the former July 16 and the latter August 12.

3. Wells, "Gold Camps," 71. See Idaho Bureau of Mines and Geology.

4. Several other small mining companies, more partnerships than anything else, have been reported in these sources: "Leesburg," The (Salmon) Idaho Recorder, 26 March 1890, 3; Bannock Post, 9 February 1867, 2, cited in Gardner, "Cultural Setting," 20; Wells, "Gold Camps," 72. See Idaho Bureau of Mines and Geology; Brian Shovers and Lynn Fredlund, "Cultural Resources Inventory and Evaluation: Beartrack Prospect, Leesburg, Idaho," (Butte, Montana: GCM Services, Inc., 1989), 5. Kirkpatrick, Leesburg Pioneers, 74-75, 92, 106 identified a few nineteenth century hydraulic mining operations.

5. "Leesburg;" Shoup, History of Lemhi County, 6; Wells, "Gold Camps," 72. See Idaho Bureau of Mines and Geology; Dan Scurlock, Susan Perlman, and Amy Earls, "Demographics," in "Cultural Resources Investigations of Leesburg and Vicinity, Lemhi County, Idaho: Draft," (Austin, Texas, and Reno, Nevada: Mariah Associates, 1992), 385.

6. Dan Scurlock, Amy Earls, and Jason D. Marmor, "Socio-Political Organization," in "Cultural Resources Investigations of Leesburg and Vicinity, Lemhi County, Idaho: Draft," (Austin, Texas, and Reno, Nevada: Mariah Associates, 1992), 345.

7. Idaho Bureau of Mines and Geology, "Reconnaissance Geology of the Leesburg Quadrangle, Lemhi County, Idaho," by Philip N. Shockey, Idaho Bureau of Mines and Geology Pamphlet 113 (Moscow, Idaho: Idaho Bureau of Mines and Geology, 1957), 32-33; Gardner, "Cultural Setting," 32; Umpleby, "Ore Deposits of Lemhi County," 152-153. See U.S. Department of the Interior; Mineral Resources of the United States, (Washington, D.C.: Geological Survey, 1921 and 1922).

8. Census records indicate that Leesburg's population was significantly smaller throughout the twentieth century than it was at any time between 1870 and 1900; Scurlock, "Demographics," 385.

9. Gardner, "Cultural Setting," 34, citing the Engineering and Mining Journal (13 January 1917, 95-96 and 19 November 1898), mentions both 1896 and 1898 as start-up dates for the Moose Creek dredge. S.H. Lorain and O.H. Metzger report an

1899 start date and a 1919 end date in U.S. Department of the Interior, Bureau of Mines, "Reconnaissance of Placer-Mining Districts in Lemhi County, Idaho," U.S. Bureau of Mines Information Circular 7082 (1939), 57.

10. Gardner, "Cultural Setting," 34; however, the Engineering and Mining Journal (10 March 1928, 429) reported that $1 million was produced at the Moose Creek placers by hydraulicking and only $½ million by dredging.

11. Idaho Bureau of Mines and Geology, Inspector of Mines, Annual Reports of the Mining Industry of Idaho (1904-1955); U.S. Department of the Interior, Geological Survey, Mineral Resources of the United States (1908-1924); U.S. Department of Commerce, Bureau of Mines, Mineral Resources of the United States (1925-1932); U.S. Department of Commerce, Bureau of Mines, Minerals Yearbook (Washington: Bureau of Mines, 1934-1955).

12. Wells, "Gold Camps," 67. See Idaho Bureau of Mines and Geology; Shoup, History of Lemhi County, 6, 12.

13. Idaho Secretary of State, "Articles of Incorporation" of the Gold Dust Mining Company," 7 October 1895, located at the Idaho Secretary of State's Office, Boise.

14. O.E. Kirkpatrick, "A Brief Story of My Life," Snake River Echoes, vol. 8, no. 1 (1979): 3; Engineering and Mining Journal, 8 August 1896, 133.

15. One source suggests that there was a mill on the property as early as 1901-1902: R.E. Allan, "Hasbrouch et al. Placers Mineral Application Report," (Salmon: Salmon National Forest Supervisor's Office, 1919), cited in Jason D. Marmor, "Mining Technology," in "Cultural Resources Investigations of Leesburg and Vicinity, Lemhi County, Idaho: Draft," (Austin, Texas, and Reno, Nevada: Mariah Associates, 1992), 334. However, other sources reported that 25 men were employed by the Gold Dust in 1903, when a 10-stamp mill and concentrator were erected: "Leesburg Locals," The (Salmon) Idaho Recorder, 17 July 1903, 3; Idaho Bureau of Mines and Geology, Inspector of Mines, Report of the Mining Districts of Idaho for the Year 1903.

16. Idaho Secretary of State, "Articles of Incorporation" of the Leesburg Gold Dust Mining Company," 27 March 1911, located at the Idaho Secretary of State's Office, Boise.

17. Idaho Bureau of Mines and Geology, Inspector of Mines, Seventh Annual Report of the Mining Industry of Idaho for the Year 1905, 85.

18. Alexander R. Dunbar, American Mining and Metallurgical Manual, 1924-25 Edition (Westminister, Colorado: The Mining Manual Co., 1924), 150.

19. "Articles of Incorporation" of the Leesburg Gold Dust Mining Company.

20. Mineral Resources of the United States (1921). See U.S. Department of the Interior; Annual Reports of the Mining Industry of Idaho (1911-1927). See Idaho Bureau of Mines and Geology.

21. "Lemhi County Deed Record Mining" Book Z, 21 June 1920, 363-364.

22. Idaho Bureau of Mines and Geology, Inspector of Mines, Twenty-eighth Annual Report of the Mining Industry of Idaho for the Year 1926.

23. "Leesburg," (Salmon) Recorder Herald, 21 September 1927, 2.

24. Lemhi County, Idaho, "Articles of Incorporation" of the Leesburg Lode and Placer Mining Company, 31 May 1930, located at the Lemhi County Courthouse, Salmon.

25. Annual Reports of the Mining Industry of Idaho (1930-1939). See Idaho Bureau of Mines and Geology.

26. Umpleby, "Ore Deposits of Lemhi County," 154. See U.S. Department of the Interior.

27. Dick Shoup, Interview by Mitzi Rossillon, 19 August 1982, Interview #10, Salmon National Forest Supervisor's Office, Salmon.

28. Kirkpatrick, "A Brief Story," 3; "Funeral Service O.E. Kirkpatrick," (Salmon) Recorder Herald, 20 December 1939.

29. Idaho Bureau of Mines and Geology, Inspector of Mines, Report of the Mining Districts of Idaho for the Year 1904, 109; "The Gold Ridge Mine," The (Salmon) Idaho Recorder, 15 November 1906, 8.

30. "Lemhi County Index to Mining Claims."

31. Lorain and Metzger, "Placer-Mining Districts in Lemhi County," 50. See U.S. Department of the Interior; "Leesburg," (Salmon) Recorder Herald, 26 October 1927, 2; "Rich Placer Concentrates," The (Salmon) Idaho Recorder, 6 July 1905, 2.

32. Kirkpatrick, Leesburg Pioneers.

33. Kirkpatrick, "A Brief Story," 4; "Lemhi County Official Election Returns," The (Salmon) Idaho Recorder, 24 November 1904, 1.

34. Stephan E. Matz, Site form for SL-494, log cabin at Gold Dust, located at the Salmon National Forest Supervisor's Office, Salmon, 1986; Lynn Fredlund and Brian Shovers, Site form addendum for SL-494, Gold Dust Mine, Mill & Residential Complex, located at the Salmon National Forest Supervisor's Office, Salmon, 1988.

35. Patrick L. O'Neill and others, "Site and Feature Descriptions," in "Cultural Resources Investigations of Leesburg and Vicinity, Lemhi County, Idaho: Draft," (Austin, Texas, and Reno, Nevada: Mariah Associates, 1992), 178-182; Matz, Site form for SL-494.

36. "Leesburg Locals," The (Salmon) Idaho Recorder, 18 September 1903, 3.

37. O'Neill, "Site and Feature Descriptions," 171-174.

38. Ibid., 174-177.

39. Ibid., 170-171.

40. "Leesburg Gold Mines," The (Salmon) Idaho Recorder, 13 November 1903, 1.

41. Ibid.

42. Pocatello (Idaho) Chieftain, September 1938, cited in Gardner, "Cultural Setting," 37.

43. "The Gold Dust Mine," The (Salmon) Idaho Recorder, 28 August 1903, 1.

44. E. Henry Davies, Machinery for Metalliferous Mines, 2nd ed. (London: Crosby Lockwood and Son, 1902).

45. Ibid., 368-369.

46. Ibid., 221-226.

47. Ibid., 261, 275, 369.

48. Ibid., 277-291.

49. Ibid., 412.

50. Arthur F. Taggart, Handbook of Mineral Dressing (New York: John Wiley and Sons, 1945), chap. 14, 10-22.

51. Davies, Metalliferous Mines, 438, 442.

52. Ibid., Fig. 248, 369.

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